TeleComp
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# X25PAD APPLICATION

# USER'S MANUAL

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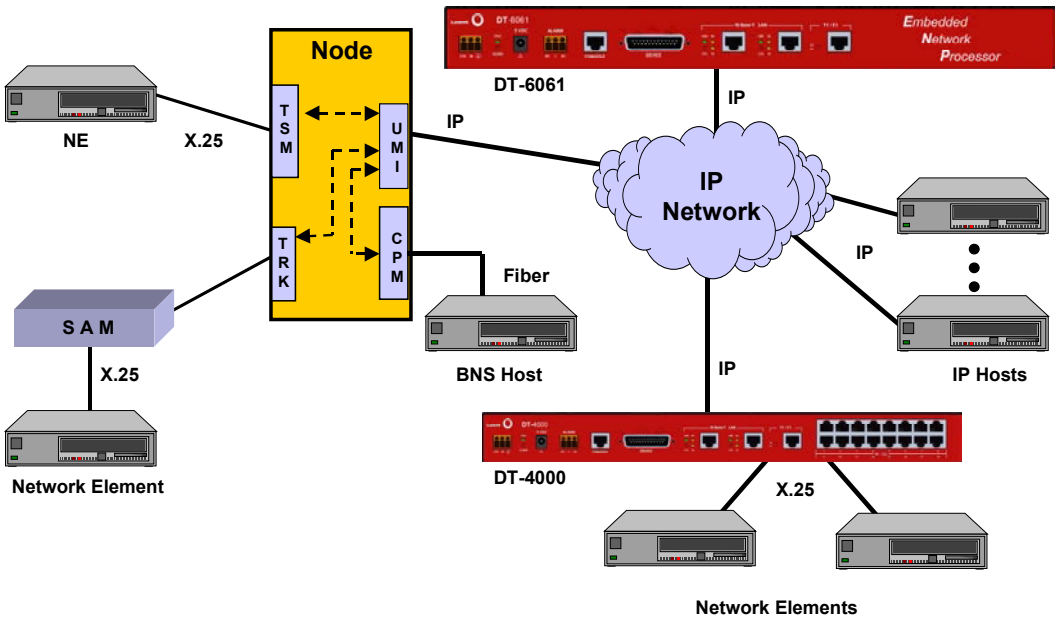
## 1. INTRODUCTION

The X25PAD Application eliminates the need, complexity, or expense of specialized X.25 equipment and allows any available port on a DT-4xxx, DT-2020 connected SAM, or BNS endpoint such as a SAM port, to be used for Network Element (NE) access.

The X25PAD Application of the DT-6061 allows an X.25 device to be connected to a synchronous port anywhere in the network. Supporting both **X.3 PAD** and **Pass-Through** functionality on a per virtual circuit basis, X25PAD Application connections to virtual circuits on an X.25 port are provided with a telnet TCP/IP connection.

The following diagram depicts a configuration of BNS network elements and non-BNS network elements with BNS/non-BNS hosts that require access to those network elements.

**DT-6061 with X25PAD Application (Typical Configuration)**




In the above configuration, there is one circuit carrying X.25 LAPB frames from the DT-6061 to a DT-4000 connected Network Element (NE) or a SAM connected NE. The X.25 Network Element may be anywhere on the available networks *(both BNS and IP)* as the above diagram depicts. IP Hosts access the virtual circuits on these Network Elements via a TCP port number. BNS Hosts

access the virtual circuit via the UMI[1]. The same is true of terminal and PC devices on either the BNS or the IP network.

## 1.2 Application Specifications

| | |
|---|---|
| Number of X.25 devices per DT-6061 | 30 |
| Number of Virtual Circuits per X.25 Device | 1-100 |
| PAD Service | Yes (Per Virtual Circuit) |
| X.25 Pass-Through Service | Yes (Per Virtual Circuit) |
| RFC 1006 ISO Service | Yes (Per Virtual Circuit) |
| Binary Service | Yes (Per Virtual Circuit) |
| Number of OA&M Channels available | 30. One per X.25 device. |
| Measurements Available | LAPB, Packet Layer, PAD, Byte Counts, Error Counts. |
| Alarms | Yes |
| SNMP (DT-6061 Agent) | Yes |
| Fault Tolerant | Yes. Using two DT-6061 in a high availability configuration. |

## 1.3 Application Basic Architecture & Operation

### 1.3.1 Interface Types

There are three distinct interface types on the X25PAD application.

**The Configuration Circuits**

This interface type is used for configuration and administration of the X25PAD application for a particular X.25 connection via Telnet.

**The Virtual X.25 Line Circuits**

For this interface type, one virtual X.25 line is configured to receive on a TCP Port. This TCP port will then listen for the TCP call from the DT-4000, UMI, etc. The specific TCP port used is the **configured base + 0**.

**The X.25 VCC (via X.3 PAD) Circuits.**

For this interface type, one TCP port is configured per VCC on the X.25 line. These TCP ports will listen for a call from an endpoint that requires access to the VCC. The specific TCP ports used begin at the **configured base + 1** for X.25 VCC 1, and increment in proportion.

### 1.3.2 Circuit Usage Example

The **X25PAD** application would have its (B)X.25 line, and per circuit configuration entered. This includes the base TCP port number that establishes the range of TCP ports relating to that X.25 line.

[1] The UMI allows both synchronous and asynchronous endpoints connected to a BNS network to access endpoints on an IP network. Similarly, endpoints on an IP network can access both synchronous and asynchronous endpoints on a BNS network.

Once restored to service, the X.25 line TCP port (offset 0 from the base) listens for in inbound call from a DT-4000, UMI, or DT-2020/SAM port. This establishes the connectivity with the remote X.25 network element endpoint.

The VCC TCP ports (offset 1 – Number of Virtual Circuits) will listen on their respective TCP ports for inbound calls as well. Any host, or other IP endpoint, may make a telnet call to these TCP ports for per virtual circuit connectivity to the X.25 network element.

### 1.4 X25PAD Application Configuration

The configuration of the X.25 application takes place on its OA&M port. That is TCP port number 10000 + its instance number in the DT-6061.

The configuration required for the X25PAD application is:

- ***Per application:*** This is the TCP port number to be used as a base for a range of TCP ports the application instance shall use. The synchronous transport to the X.25 network element occurs at offset zero to this base TCP port number. The individual X.25 virtual circuits are identified by the base TCP port number plus the X.25 virtual circuit port number.
- ***Per X.25 line:*** These consist of the LAPB transmission window size and other link layer parameters.
- ***Per X.25 VCC:*** These consist of the PAD profile associated with the VCC, the window size to be used for transmission in the X.25 packet layer, and other parameters associated on a per virtual circuit basis.

## The Per X.25 Line Configuration parameters are as follows:

| Parameter | Values | Default | Units |
|---|---|---|---|
| X.25 Logical Line Type | DTE, DCE | DCE | |
| Number of X.25 VCs | 16 | 8 | |
| Default Max Packet Size[2] | 128, 256,512,1024 | 128 | Bytes |
| LAPB Tx Window Size | 1-7 | 2 | Frames |
| Waiting ACK Time (T1) | 1-60 | 3 | Seconds |
| Maximum Attempts to complete a Transmission (N2) | 1-255 | 7 | Seconds |
| Action when N2 Count Exceeded[3] | Disc, reset. | Reset | |
| Action when DISC received[4] | Disc, reset. | Reset | |

[2] The 1980 standard provided for 128 byte packet sizes. The 1984 standard increased the maximum size to 256 bytes. Later standards have optionally increased that number. However, nearly all implementations of X.25 follow the 1984 standard, and it is considered the default for all implementations known to date.
[3] The X25PAD application currently supports only (B)X.25 PVCs. As such a DISC action is not defined.
[4] Receipt of a DISC on an (B)X.25 PVC is not valid. This is not currently supported.

## The per VCC configuration parameters are as follows:

| Parameter | Values | Default | Units |
|---|---|---|---|
| Packet Layer Window | 1-7 | 2 | Packets |
| Circuit Type | PVC or SVC | PVC | |
| PAD Inactivity Timer (T) | 2-20, OFF | OFF | Seconds |
| Profile ID | Value, Transparent | Transparent | |
| SVC calling address to use | DNIC+NTN | None | ** SVC VCs Only ** |
| SVC called address to use | DNIC+NTN | None | ** SVC VCs Only ** |
| User Data Lengh & Contents | Binary Data | 0xC1 | ** SVC VCs Only ** |
| Extended Calling Address | NSAP | None | ** ISO SVC VCs ** |
| Extended Called Address | NSAP | None | ** ISO SVC VCs ** |

# 2. Applications Commands

The DT-6061 software is composed of two components. One component, called the ***Platform,*** exists to support all applications. The second component is comprised of the individual **application*(s)***.

The ***Platform*** provides Operating System functions, selected interfaces, protocol stacks, SNMP functions, and system OA&M while each **application** uses the services of the resident ***Platform***.

## 2.1 Input Conventions

All parameters may be given on the command line. Parameters of the form **name=<value>** may be given in any order.

For several complex commands, listed below, missing parameters, or corrections of errors in given parameters, of the form **name=<value>** are collected by prompting the console user. The user responds to a prompt for the **name** by typing the required **<value>** followed by *newline*. Defaults are supplied in some cases, so the user need only enter *newline*.

- Commands may be entered in upper or lower case.
- Parameters of the form **name=value** may use upper or lower case for **name**.
- Default values, if any, are shown in parenthesis as part of the prompt.
- Case is preserved for values.
- When a password is being requested by a prompt, input is not echoed.
- Backspace erases one character and **@** deletes the current line of input. Most commands are killed by **del** key.

## 2.2 Login

**Syntax: login PASSWD=<password>** *(The default password is "**initial**")*

The **login** command is used to allow access to the other configuration commands.

The **PASSWD** parameter is not echo suppressed. However, if the **PASSWD** parameter is not provided, the console prompts for a password; the response *is* an asterisk echo in this case.

If the password is valid, the user is placed in the *logged in* mode. Once the console user is logged *in*, the balance of the commands are accessible.

*Note: Each application instance is allowed to be assigned a different password.*

## 2.3 Logout

**Syntax: logout**

The **logout** command is only allowed if the console user is logged *in*. It requires no arguments. It will set the console to the logged *out* mode.

Passwords are up to seven characters in length. The characters are alphanumeric and special characters are not allowed.

## 2.4 Change Password

**Syntax: chgpass PASSWD=<old> NEWPASS=<new> CONFIRM=<new>**

The chgpass command is used to change a user password on the system console. The command is only allowed if the user is logged *in*.

All three parameters must be given on the same line as the command. None of those entries are echo-suppressed.

If the current password is valid, and the two entries for the new password match, the password is changed to the new value.

## 2.5 Help

**Syntax: help [ Command ]**

The **help** command is always visible. The **help** command displays the currently allowed commands for the mode that the unit is currently entered. If the optional **[ Command ]** is provided, the displayed help will be limited to that command.

## 2.6 Version

**Syntax: ver**

The **version** command is only visible when the application is *logged in*. The command has no arguments. It displays the current build, software version, and database version of the **X25PAD** application.

## 2.7 Placing Components In Service

**Syntax: rs <link | <vc XXX>>**

The **restore** command is only visible when the application is *logged in*. The command is used to place the X.25 Link, or any of the X.25 virtual circuits, into service. A TCP connection is not available until the component is placed into service.

At least one argument is required. That argument is the component type to be placed into service. There is only a single X.25 link, and multiple X.25 virtual circuits on that link which may be individually brought into service.

Once the component is brought into service, it will await a TCP session if the connection type is **rcv**. If the connection type is **orig**, a TCP session will be established with the endpoint specified in the component configuration. Please see the sections that follow for configuration of both the link, and the virtual circuits.

It should be noted that when there are multiple VC with the same TCP port (i.e. a hunt group), the restore command on any one VC in the group will act on all the VCs in the group.

## 2.8 Taking Components Out of Service

**Syntax: rm <link | <vc XXX>>**

The **remove** command is only visible when the application is *logged in*. The command is used to place the X.25 Link, or any of the X.25 virtual circuits, out of service. Any TCP connection using those components is automatically taken down when the component is removed from service.

At least one argument is required. That argument is the component type to be removed from service. There is only a single X.25 link, and multiple X.25 virtual circuits on that link which may be individually removed from service.

It should be noted that when there are multiple VC with the same TCP port (i.e. a hunt group), the remove command on any one VC in the group will act on all the VCs in the group.

## 2.9 Configuring General & Link Parameters

**Syntax: link [base=<TCP Port#>]**
**[type=<RCV|ORIG>]**
**[dest=<IP Address>] [dport=<TCP Port>]**
**[dxe=<DCE|DTE>]**
**[numvcc=<#VCC>] [win=<#>] [T1=<#>] [N2=<#>]**
**[cug=[+|-]<CUG Number>]**

The **link** command is only visible when the application is logged in. The command is used to configure a Virtual X.25 line termination.

The **base** parameter is the TCP port number base at which the X.25 line, and the associated X.25 virtual circuits, are to be IP terminated. The default is computed as follows:

```
Default TCP Base=((<Application Instance# > -1)*200)+30000
```

For example, instance #1 of the application will have its base address at **30000**. The X.25 link would be connected at that TCP port number. The first VC would be at TCP **30001**, and so on.

When the X.25 link is to be on an incoming TCP session, the **type** would be set to **rcv**. The X.25 link would reside at the TCP port specified by the **base** parameter.

When the X.25 link is to be on an outgoing TCP session, the **type** would be set to **orig**. The IP address would be specified by the **dest** parameter, and the TCP port at that IP address would be specified by the **dport** parameter.

The **dxe** parameter specifies the logical gender of the (B)X.25 connection. The **dxe** defaults to the value of **dce**. When the **dxe** is **dce**, it is expected that the (B)X.25 device is a logical **dte**. When the **dxe** is **dte**, it is expected that the (B)X.25 device is a logical **dce**. Please note that it is still possible for the device to be a physical dce, or dte regardless of this value. This parameter refers only to the LAPB logical gender.

The **numvcc** parameter is the number of X.25 virtual circuits to be supported. The default is 16.

The **win** parameter specifies the LAPB window size to be used for transmission. The Window size is always 8 frames for receive. The default transmission window size is 2 per the ITU specification X.25.

The **t1** parameter specifies the value of the T1 timer. The timer defaults to the recommendation of the ITU specification X.25. It is provided as an option for non-standard configurations.

The **n2** parameter specifies the value of the N2 retry counter. The value defaults to the recommendation of the ITU specification X.25. It is provided as an option for non-standard configurations.

The **cug** parameter allows the link connection to be protected by a closed user group. These are defined with the *cug* command specified later in this section. Any or all *cug* entries may be associated with the link.

## 2.10 VIRTUAL CIRCUIT CONFIGURATION

**Syntax: vc <vc#> [win=<#>]**
**[ckt=< SVC | PVC >]**
**[maxpkt=<128 | 256 | 512 | 1024>]**
**[svc=< pad | pass | MACSTAR | RBP | ISO | BIN | SESS >]**
**[type=<RCV|ORIG>]**
**[dest=<IP Address>] [dport=<TCP Port>]**
**[hport=<TCP Port>]**
**[calling=< DNIC+NTN | DELETE >]**
**[called=< DNIC+NTN | DELETE >]**
**[ext_calling=<NSAP> | DELETE ]**
**[ext_called=<NSAP> | DELETE ]**
**[svctclass=< NONE | Throughput >]**
**[ulen=< User Data Length >]**
**[udata#=< Hexadecimal Value >]**

The **VC** command is only visible when the application is logged in. The command is used to configure a virtual circuit connection to a Virtual X.25 line.

The **<VC#>** parameter refers to the virtual circuit configured on the X.25 line. It has the range of 1 through the number of circuits configured.

When the X.25 virtual circuit is to be placed on an incoming TCP session, the **type** would be set to **rcv**. The X.25 virtual circuit would reside at the TCP port specified by the **hport** parameter. A default TCP port is unique to each VC. By using the same TCP port in multiple VCs, hunt groups may be created. The VC numbers do not need to be contiguous to create a hunt group.

When the X.25 virtual circuit is to be placed on an outgoing TCP session, the **type** would be set to **orig**. The IP address would be specified by the **dest** parameter, and the TCP port at that IP address would be specified by the **dport** parameter.

The **win** parameter refers to the packet layer window size to be used for transmission purposes. It defaults to the value of 2 per the ITU Recommendation X.25.

The **svc** parameter allows the type of service to be performed on the virtual circuit. When the value of **PAD** is selected, the virtual circuit is terminated in a X.3 PAD service. When the value of **PASS** is selected, an X.25 pass-through service is selected. When the value of **MACSTAR** is selected, a proprietary interface with the **MACSTAR** operations system is selected. The value of **ISO** selects RFC 1006 encapsulation of **ISO** (B)X.25 over TCP/IP. The value of **BIN** is a straight binary interface without additional encapsulation. The value of **RBP** is the Reservation Boundary Protocol over TCP/IP. The value of **SESS** selects an implementation of the BX.25 Session Layer on this VC. This BX.25 Session Layer within the **X25PAD** is a vertical service above the packet layer. The BX.25 Session Layer may be used in conjunction with the BX.25 Session Layer API library, or as a standalone service.

The **ckt** parameter allows the type of virtual circuit to be configured. The default is **PVC** to define a permanent virtual circuit. When defined as a **PVC**, the circuit will still accept call requests and clears but will not generate them. When defined as an **SVC**, the circuit will generate a call request when a connection is made to the VC, and a call clear when a connection to the VC is dropped. Optional parameters allow the specification of the contents of the call X.25 packet.

The **calling** parameter allows the specification of a calling DNIC+NTN that is contained in the call packet generated on an **SVC**. The default is that no calling information is provided. The **DELETE** option specifies the removal of the calling DNIC+NTN.

The **called** parameter allows the specification of a called DNIC+NTN that is contained in the call packet generated on an **SVC**. The default is that no called information is provided. The **DELETE** option specifies the removal of the called DNIC+NTN.

The **ext_calling** and **ext_called** parameters allows the specification of address extensions used in an **ISO** concatenated (B)X.25 network. The extensions allow addresses to be propagated across the subnetwork attachment where the networks are concatenated. These extensions were proposed in the 1984 X.25 specification and adopted in the 1988 X.25 specification. A value of **DELETE** will remove the parameter from the virtual circuit.

The **svctclass=< NONE | Throughput >** option specifies a throughput class declared on X.25 call connect, and call accept packets. The throughput class is the same in both transmit and receive directions. As a general rule, it should always be set to **NONE** such that no limiting throughput class is established. All specification allowable values for throughput class are supported. These range from 75bps to 48000bps inclusive. The option is provided for interface to devices that require a throughput class to be explicitly negotiated.

The **ulen** parameter defines the size of the User Data field in the call packet. The allowed values are one through 16 bytes inclusive. Modification of the user data field with the **udata#** parameter will affect the value of the user data length automatically.

The **udata#** parameter defines the contents of one byte. The **#** is to be replaced with a number in the range of one through 16 inclusive (e.g. udata1=0xC1). The default user data is one byte in length and contains the value 0xC1.

The **maxpkt** parameter specifies the size of the X.25 packet generated when the data stream has not met its termination condition and is therefore generated with the M-BIT. The actual size of the packet is 3 bytes larger to accommodate X.25 protocol overhead.

## 2.11 CONFIGURING PAD PARAMETERS

**Syntax: pad <vc #>[echo=<ON|OFF>]**
**[fwd=< none | cr | crdrop | semi | all | GRPx>]**
**[idle=<#ticks>]**
**[break=<none|intr|reset|brkind>]**
**[parity=<TRANS | EVEN | ODD>]**
**[crlf=<none|rmt|vc|both>]**
**[inact=<# seconds>|OFF]**
**[cmap=< ON | OFF >]**
**[cug=[+|-]<CUG Number>]**

The **PAD** command is only visible when the application is logged in. The command is used to configure the X.3 PAD parameters of a virtual circuit. These parameters have relevance only if the service selected on the virtual circuit is *PAD.*

The **<VC #>** parameter refers to the virtual circuit configured on the X.25 line. It has the range of one through the number of circuits configured.

The **echo** option refers to reference #2 in the X.3 parameter list. When set to **OFF**, the X25PAD will not echo characters back to the IP endpoint. When set to the value of **ON**, all characters are to be echoed back to the IP source.

The **fwd=<NONE | CR | CRDROP | SEMI | ALL | GRPx>** option specifies reference #3 of the X.3 parameter list. This is the forwarding condition (outside the PAD timer) which will forward data towards the X.25 virtual circuit. A value of **NONE** indicates that there are no character forwarding conditions. A value of **CR** indicates that a carriage return will forward any accumulated data (including the carriage return). A value of **CRDROP** indicates that a carriage return will forward any accumulated data (but not including the carriage return). A value of **SEMI** indicates that a semicolon will forward any accumulated data including the semicolon. A value of **ALL** indicates that all data is to be forwarded immediately. The **ALL** option has the effect of generating single user character X.25 packets on this virtual circuit. The **GRPx** values specify selected groups of forwarding characters. **GRP1** forwards on ESC, BEL, ENQ, and NAK. **GRP2** forwards on DEL, CAN, DC2. **GRP3** forwards on ETX, EOT. **GRP4** forwards on HT, LF, VT, and FF. Multiple forwarding conditions are allowed simultaneously. Setting **fwd** to a value aggregates with the previous value of **fwd**. The **fwd=none** is required to clear the forwarding conditions.

The **idle** parameter refers to reference #4 in the X.3 parameter list. This is the time forwarding condition. When it expires, it will forward any data collected to the X.25 circuit. The timer is reset to the specified value whenever a forwarding condition is reached. The value is based on ticks of $1/20^{th}$ of a second each per the X.3 specification.

The **break** parameter refers to reference #7 in the X.3 parameter list. This is the action to be taken when a break indication (a standard telnet encapsulated value) is received from the remote IP endpoint. The value of **NONE** will ignore the break, and it is deleted from the data stream. The value of **INTR** will generate an X.25 interrupt packet. The value of **RESET** will generate an X.25 virtual circuit reset. The value of **BRKIND** will generate an X.29 “indication of break” message on the X.25 virtual circuit.

The **parity** parameter is not present in the X.3 parameter list. It allows special parity treatment for interface to network elements that require parity. The default value is *transparent* operation. The value of **TRANS** sets the operation to be *transparent.* When the parity treatment is *transparent*, the data is not modified in either direction. The value of **EVEN** sets the operation to be *even parity* towards the (B)X.25 device, and stripped parity towards the TELNET. The value of **ODD** sets the operation to be *odd parity* towards the (B)X.25 device, and stripped parity towards the TELNET.

The **crlf** parameter refers to reference #13 in the X.3 parameter list. This is the action to be taken when a CR is received in the data stream from the remote IP endpoint. A value of NONE indicates that there is to be no LF (line feed) insertion. A value of **RMT** will insert an LF following a CR whenever it is sent towards the remote IP endpoint. A value of **VC** will insert an LF following a CR whenever it is sent towards the X.25 virtual circuit. A value of **BOTH** will insert an LF following a CR in either direction.

The **inact** option refers to the PAD inactivity timer. If enabled, the TCP session on that X.25 virtual circuit is disconnected when the inactivity timer expires. The value defaults to OFF.

The **cmap** option provides the automatic case mapping from lower case to upper case. When **ON**, all lower case characters are automatically converted to upper case. When **OFF**, no transformations are performed.

The **cug** parameter allows the virtual circuit connection to be protected by a closed user group. The closed user group feature is significant only for PAD service. The closed user group address entries are defined with the *cug* command specified later in this section. Any or all *cug* entries may be associated with the virtual circuit.

## 2.12 Display Measurements

**Syntax: dmeas <link |vc <#> >**

The **dmeas** command is only visible when the application is logged in. The command is used to display the current measurements on either the X.25 link or per virtual circuit.

The **LINK** parameter will display the measurement information for the X.25 link being supported by this instance of the application.

The **VC <#>** option will display the measurement information for a particular X.25 virtual circuit on the link. The virtual circuit number is in the range of one through the maximum number supported by the application.

## 2.13 Verify Configuration

**Syntax: vfy [ all | app | link | cug | vc <#>]**

The **vfy** command is only visible when the application is logged in. The command is used to display the configured options on the X.25 link, or a virtual circuit resident on the X.25 link.

The **LINK** parameter will display the configuration information for the X.25 link being supported by this instance of the application.

The **VC <#>** parameter will display the configuration information for a particular X.25 virtual circuit on the link. The virtual circuit number is in the range of 1 through the maximum number supported by the application.

The **APP** parameter will display information about the application instance. This includes user comments, and the instance identifier.

The **CUG** parameter will display information about the configuration of the closed user groups.

## 2.14 Displaying Current Connections

**Syntax: dc**

The **dc** command is used to display all of the current connections into the X25PAD application. This includes the X.25 link, and any X.25 virtual circuit connections. The command will issue a report that shows the connection peer for each active connection.

## 2.15 Snooping X.25 Traffic

**Syntax: snoop [OFF | L2 | ALL | <VC# Range>] [ verbose ]**

The X25PAD application has a diagnostic ability to snoop on either X.25 link at the LAPB layer, or on an individual circuit at the packet layer. This is done with the **snoop** command. All output is directed to the OA&M connection.

If the command is invoked with no arguments, it produces a report of all active snooper configurations.

If the command is invoked with the **OFF** option, all of the snooper configurations are disabled.

If the command is invoked with the **L2** option, the LAPB interface to the X.25 device is snooped. Output is displayed on the OA&M session. Please note that this could be extensive for a moderately busy X.25 line.

If the command is invoked with the **ALL** option, the LAPB interface and all of the virtual circuits that have been configured have snooping enabled.

If the command is invoked with a virtual circuit number in the range of 1 through the maximum number of X.25 circuits; the packet layer of the circuit specified is snooped. The number may be specified as a range (e.g. 1-5).

The additional parameter of **[verbose]** will display all of the data bytes in addition to the standard decoding. The output of this option may become quite voluminous.

## 2.16 Restart X.25 Operation

**Syntax: restart**

The **restart** command is only visible when the application is logged in. The command is used to manually initiate a protocol restart of the X.25 link and packet layers.

## 2.17 Prompt Labels

**Syntax: label [ "Any Label" | NONE ]**

The prompt on the application console may be customized with a label up to sixty characters in length. Spaces and special characters are allowed within the double quotes. The double quotes are required on this command. The value of **none** deletes any existing label on the prompt. The current configuration is displayed during a *verify configuration*, by invoking the **label** command without arguments, or merely by the prompt display.

## 2.18 Application Comments

**Syntax: comment [ L1="Any Comment"]**
**[ L2="Any Comment"]**
**[ L3="Any Comment"]**

The **X25PAD** application may have comments which are displayed with the *verify configuration* command. Up to three lines of comments are available. Each line may have a comment up to 64 characters in length. Each comment is double quoted to allow for spaces to be embedded. A comment with no characters (i.e. "") is used to delete a comment which is not desired. It is not necessary to delete prior to adding a new comment. The new comment shall replace the existing comment at the line specified.

## 2.19 Display of Remote EIA leads

**Syntax: deia**

The **deia** command allows a user to display the EIA leads of the BX.25 Network Element connection from a DT-4000 or SAM device. The command does not affect data transport, and may be done at any time.

## 2.20 Closed User Groups

**Syntax: cug <CUG Number> [ipaddr=<IP Address>] [submask=<IP Mask>]**

The **CUG** command allows the definition of address sets to create multiple closed user groups. The address sets are then used by the link, console, and virtual circuits in creating individual closed user groups. The **<CUG Number>** has a range of one through sixteen.

## 2.21 CONSOLE SECURITY

**Syntax: console [cug=[+|-]<CUG Number>]**

The **CONSOLE** command allows the assignment of a closed user group to the administration session. The closed user group must include the current administrator to prevent accidental lockout. This restriction is enforced.

## 2.22 X25PAD INSTALL (Installing Software & Resetting the Password)

**Syntax: install [ key=<software key> ]**

The **X25PAD** application has a unique software key. The installation of the key is performed by the factory, and need only be done if the software is changed in the field.

When executed without arguments, the install command will display the significant information needed to manufacture the software key.

The <software key> is an eight-character alphanumeric which is unique to the **X25PAD** application on this **DT-6xxx**. When the **install** command is entered with the **key=<software key>** option, the instance user password is reset to the original value of *initial*.

The **X25PAD** application need be installed only once on a **DT-6xxx**. The key becomes available for all **X25PAD** instances immediately.

# 3. Application Software Installation & Upgrade

An application may be initially installed, or upgraded, using the **install** command available on the platform console. Please note that this command is not the **X25PAD** **install** command that is used for key installation on the instance console.

*Refer to the DT-6061 Platform User's Manual and refer to the section titled:* ***Application Software Installation & Upgrade***

# 4. Appendix A – X25PAD Measurements Available

This appendix itemizes the measurements available using the *display measurements* (**dmeas**) command. There are two options to the **dmeas** command. These are **link** and **vc**.

The **link** option provides X.25 Link level measurements, and the **vc** option provides per virtual circuit measurements.

The base measurements are always displayed, and the error and exception counters are only displayed if nonzero.

## The link level measurements available are as follows:

| Measurement Description | Type |
|---|---|
| Number of LAPB Frames Received | Base |
| Number of LAPB Frames Transmitted | Base |
| Number of LAPB Bytes Received | Base |
| Number of LAPB Bytes Transmitted | Base |
| Number of Invalid Frames Received. | Base |
| Number of Frames Received with Channel Out of Range | Base |

## The per virtual circuit measurements available are as follows:

| Measurement Description | Type |
|---|---|
| Number of Packets Received from X.25 Link | Base |
| Number of Packets Sent to X.25 Link | Base |
| Number of Bytes Received from X.25 Link | Base |
| Number of Bytes Sent to X.25 Link | Base |
| Number of Call Request Packets Received | Exception |
| Number of Call Accept Packets Received | Exception |
| Number of Clear Request Packets Received | Exception |
| Number of Clear Confirmation Packets Received | Exception |
| Number of Interrupt Packets Received | Exception |
| Number of Interrupt Confirm Packets Received | Exception |
| Number of REJ Packets Received | Exception |
| Number of RNR Packets Received | Exception |
| Number of Reset Request Packets Received | Exception |
| Number of Reset Confirmation Packets Received | Exception |

## 5. Support for X.3 PAD Parameter values

The X25PAD supports the relevant X.3 PAD parameters. Since the X25PAD is not a physical device, some of the parameters are not readily applicable. Responses via X.29 will carry default values if queried.

The table below will indicate all the X.3 parameters, and the support of these parameters by the X25PAD application.

| Ref # | Description | Supported Options | Note | Config |
|---|---|---|---|---|
| 1 | PAD recall | 0 – None | User Command session provided by Datakit CC or DT-4000 or DT-2020. | No |
| 2 | Echo | 0 – No Echo<br>1 – Echo | | Yes |
| 3 | Data Forwarding Characters | 0 – None<br>2 – CR<br>126 – All Characters | | Yes |
| 4 | Idle Delay | 0-255 | Ticks are in 1/20$^{th}$ of a second. | Yes |
| 5 | Ancillary Device Control | 0 – None | Configured on DT-4000 or SAM/DT-2020 port configuration | No |
| 6 | Control of PAD service signals and PAD command signals. | 0 – No PAD service signals are transmitted. | DT-4000 or SAM is DTE service center. | No |
| 7 | Operation of PAD on receipt of break from IP | 0 – Nothing<br>1 – Send X.25 Interrupt<br>2 – Send X.25 Reset<br>4 – X.29 “Indication of Break” | | Yes |
| 8 | Discard Output | 0 – Normal Data Delivery | | No |
| 9 | Padding after CR | 0 – No Padding after CR | | No |
| 10 | Line Folding | 0 – No line folding | | No |
| 11 | Binary Speed | 18 – 64000bps | For Reporting Only | No |
| 12 | Flow Control of the PAD | 0 – No use of X-ON and X-OFF | These are functions of the DT-4000 and SAM devices. | No |

| | | | | |
|---|---|---|---|---|
| 13 | LineFeed Insertion after CR | 0 – No Linefeed Insertion<br>1 – Insert Linefeed after CR towards IP.<br>2 – Insert Linefeed after CR from IP | | Yes |
| 14 | Padding after Linefeed | 0 – No Padding after LF | | No |
| 15 | Editing | 0 – No use of editing. | User command session performed via the DK CC, the DT-4000, and the DT-2020. | No |
| 16 | Character Delete | None | User command session performed via the DK CC, the DT-4000, and the DT-2020. | No |
| 17 | Line Delete | None | User command session performed via the DK CC, the DT-4000, and the DT-2020. | No |
| 18 | Line Display | None | User command session performed via the DK CC, the DT-4000, and the DT-2020. | No |
| 19 | Editing PAD service signals | 0 - None | | No |
| 20 | Echo Mask | 0 - None | | No |
| 21 | Parity | 0 – No generation or checking. | Parity performed by DT-4000 or SAM. | No |
| 22 | Page Wait | 0 - Disabled | | No |
| 23 | Input field size | 0 - Undefined | User command session performed via the DK CC, the DT-4000, and the DT-2020. | No |
| 24 | End of Frame Signals | 0 – Undefined Size | EOF is determined and encoded per the RFC since this is an IP application. | No |
| 25 | Extended Data Forwarding Signals | 0 – No extended Data | | No |
| 26 | Display Interrupt | 0 – No display interrupt | | No |
| 27 | Display Interrupt Confirmation | 0 – No display interrupt confirmation. | | No |
| 28 | Diacritic Character Coding | 0 – Basic Coding | | No |

| | | | | |
|---|---|---|---|---|
| 29 | Extended Echo Mask | 0 – No Extended Echo Mask | | No |

**6 .**

# 7. APPNOTE: USING X25PAD AS AN FTAM GATEWAY

The FTAM protocol is used by ISO compliant network equipment for the transfer of files between two systems or endpoints. Typically, these endpoints are on disjoint segments of an X.25 network. That is, they are closed networks that are concatenated by an intermediate network. All the network segments are X.25 based and the call setup information needed to establish a connection was contained in extended address features that were added to the Call Setup packet during the 1984 revision to the BX.25 specification.

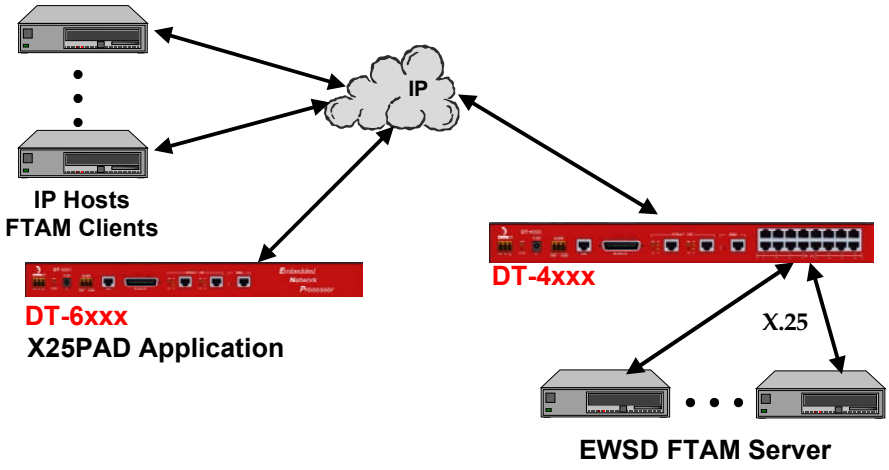
The X.25 address extensions are aimed primarily at the carrying of the NSAP addresses across concatenated networks. These addresses are independent of the subnetwork addressing scheme, and will be used at the boundary between subnetworks to derive the *Subnetwork Point of Attachment (SNPA)* for the next stage of a call. For an X.25 network, the SNPAs are the calling and called DTE address carried at the start of the call request packet immediately after the packet type identifier. The CCITT originally assumed that the address extension field needed to be 32 decimal digits. However, ISO subsequently defined this value to be 40 digits in the 1988 version of the X.25 specification. The **X25PAD** application supports the 40 digits defined in the 1988 specification for extended calling parameters.

As TCP/IP networks became prevalent, RFC 1006 was proposed as a means to deliver FTAM packets in lieu of the X.25 network specified by ISO. Because TCP is a byte stream and not a packet protocol, a header was added to each FTAM message. To date, three versions of the RFC1006 FTAM protocol have been presented. The **X25PAD** application supports the most current version (#3).

In this use, the X25PAD application acts as a gateway between an intermediate X.25 network and the TCP/IP host interface. The X25PAD presents the extended addressing needed to support concatenated X.25 networks, and mediates between the RFC1006 TCP/IP interface and the ISO X.25 interface. This is selectable on a per virtual circuit basis.

An example of such a deployment is as follows:

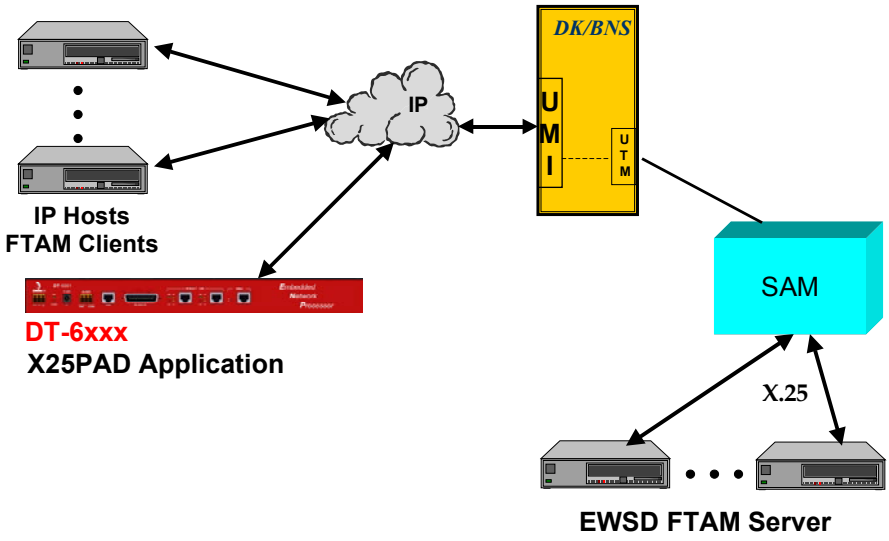
# TCP/IP to ISO FTAM Gateway




In the diagram above, the FTAM clients on the TCP/IP hosts communicate with the **X25PAD** application in the native RFC1006 FTAM protocol. The **X25PAD** mediates with the ISO based X.25 implementation of the FTAM protocol. The physical X.25 links are connected to a **DT-4xxx** serial port remote from either the **DT-6xxx** or the FTAM client hosts.

In addition, integration with a BNS network is easily achieved with a UMI module. Consider the following diagram:

## TCP/IP to ISO FTAM Gateway via BNS/DK




In the diagram above, the only change made was a UMI as the mediation point between the TCP/IP network infrastructure and the BNS/DK network infrastructure. Any variant of SAM may be used for the serial connection. Options include the SAM 64/504, a **DT-4000**, and the **DT-SAM**. The SAM and DK/BNS node need not be collocated with each other or with the DT-6xxx on which the X25PAD application resides.

Configuration of a VC to be used for FTAM service requires only the selection of the ISO protocol and the extended address parameters for the SVC call setup. An example for VC #1 follows:

```
vc 1 ext_calling=5551212 ext_called=1234567 svc=iso
```

All of the other SVC parameters remain the same.

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The warranty period for hardware shall be ninety (90) days from the date of delivery, and the warranty for software shall be 90 days from the date of delivery. Replacements and repairs are guaranteed for the longer of the remaining original warranty period or 90 days.

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